

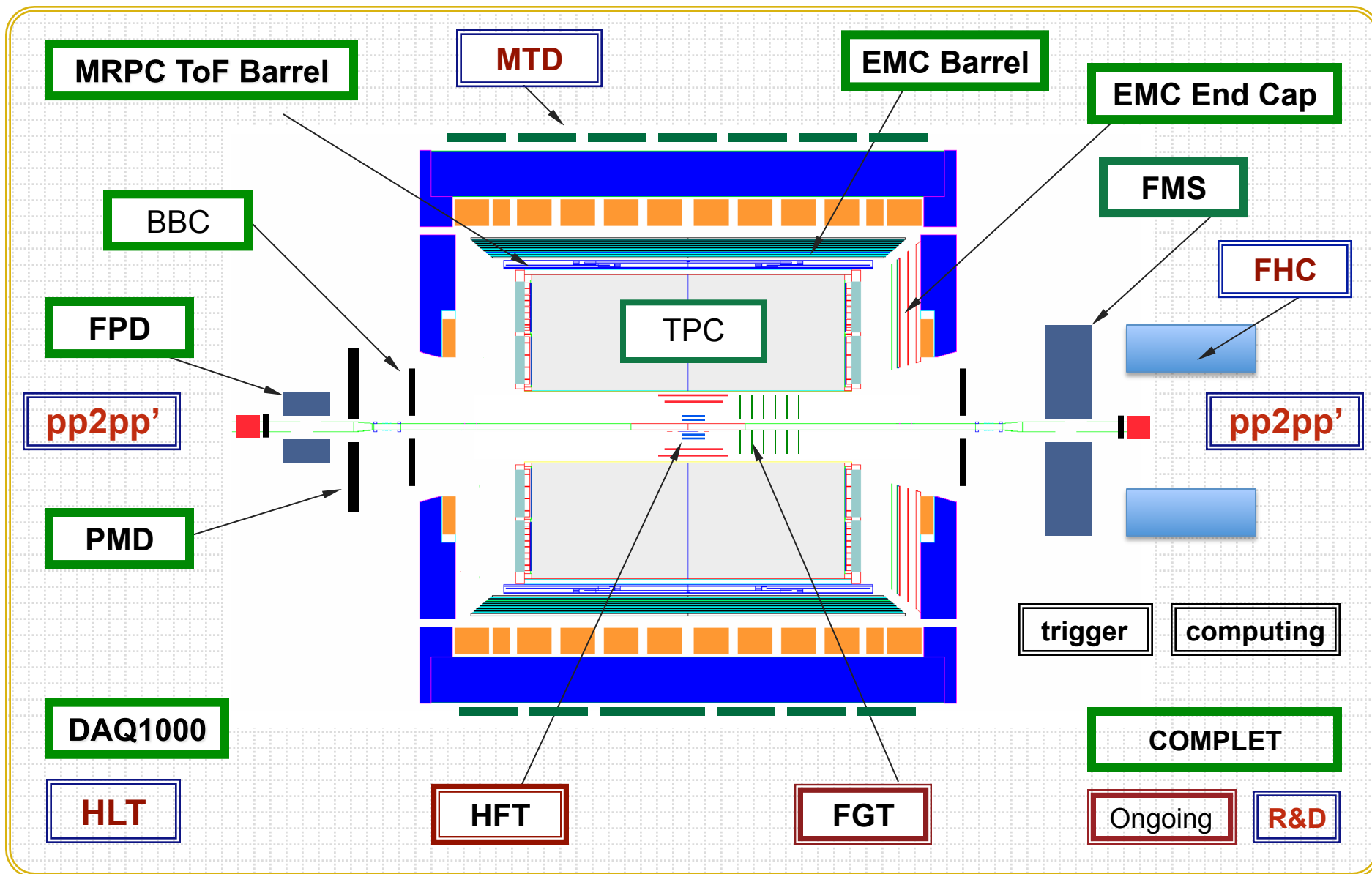
Remarks on the Upgrade & the New Decadal Plan

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STAR Experiment



Mid Term Plan

Current DOE funding plan for detector upgrades and RHIC computing

June 09 update: FY 2006-2008 as spent.; 09Approp.; 2010Pres.

	FY 2006A	FY 2007A	FY 2008A	FY 2009A	FY 2010P	FY 2011	FY 2012	FY 2013	FY 2014	
R&D funds										
PHENIX HBD	0.10									0.10
PHENIX MIEs	0.30	0.45	0.16							0.91
PHENIX DAQ	0.10	0.05	0.26	0.40	0.60	0.20	0.25			1.86
STAR Tracking	0.50	0.32	0.70	0.80	0.40	0.20	0.25			3.17
Generic Det. R&D	0.00				0.20	0.80	1.00	1.50	1.50	5.00
Total R&D	1.00	0.82	1.12	1.20	1.20	1.20	1.50	1.50	1.50	11.04
Exp. Capital										
PHENIX HBD/TOFW	0.40	0.10								0.50
STAR FMS	0.20	0.20								0.40
STAR DAQ1000	0.90	0.35	0.65	0.00	0.90					1.90
STAR FGT			0.20	0.75	0.30	0.00				1.85
PHENIX FoCal*					0.30	0.80	0.70			1.80
Exp. Infrastr.	0.60	0.35	0.45	0.75	0.80	1.00	0.85	0.85	0.85	6.50
RCF	1.30	1.70	1.70	2.00	2.50	3.00	3.00	3.00	3.00	21.20
Total Capital	3.40	2.70	3.00	3.50	4.50	4.80	4.55	3.85	3.85	34.15
MIEs										
STAR TOF	2.40	2.40								4.80
PHENIX VTX		1.60	2.00	1.10						4.70
PHENIX FVTX			0.70	4.20	0.00					4.90
STAR HFT**					1.40	2.65	5.40	5.60	0.25	15.30
Total MIE	2.40	4.00	2.70	5.30	1.40	2.65	5.40	5.60	0.25	23.85

* Pending review and approval

** Pending final science approval

Full funding in FY 09 via ARRA funds

- 1) Upgrade and detector R&D is the basic source and live for advancing science for any large detector like STAR. It is often cost effective. ***The more, the larger, R&Ds, the better.***
- 2) **Balance** the activities between R&D and data analysis, publications.
- 3) **Balance** the activities between national lab groups and universities: need to involve more university groups in STAR.

Charge for new decadal plans for STAR and PHENIX

by Steve Vigdor, Dec. 17, 2009

<http://drupal.star.bnl.gov/STAR/event/2009/12/10/star-management-meeting>

due date: Aug. 1, 2010

Decadal Plan

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BUR2011

...

Spin

B. Surrow

Heavy Ion

J. Dunlop

Upgrade

F. Videbaek



Charge for new decadal plans for STAR and PHENIX

Part-I: Summary of current upgrade and scientific reach, time line

- 1) A brief summary of the detector upgrades already (or soon to be) in progress, the timelines for completing them, the new science capabilities each adds in combination with upgraded RHIC luminosity, and your best current estimates (informed by the current strawman 5-year run plan for RHIC) of when you will be able to acquire the data that addresses the relevant science goals. This can even be summarized in tabular form, and should be consistent with the latest RHIC Midterm Plan.
- 2) The compelling science goals you foresee for RHIC A+A, p+p, and d+A collisions that can only be carried out with additional upgrades (or replacements) of detector subsystems or machine capabilities (e.g., further luminosity or diamond size improvements). For each such goal, provide some explanation of why RHIC is the appropriate facility (e.g., in competition with LHC or FAIR) to pursue that science, and preferably some simulations that demonstrate the need for new detector or machine capabilities to address the compelling questions. If the pursuit of some science goals is conditional on results to be obtained over the next several years, try to outline the decision points you foresee for deciding future paths.



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Part-II: Future R&D at RHIC and migration to EIC(?)

- 3) Prioritized, or at least time-ordered, lists of the major (above \$2M total project cost) and more modest (below \$2M total project cost) new detector upgrades your Collaboration foresees, together with R&D milestones that may have to be passed to demonstrate their technical feasibility. Also provide whatever information you have on the indicated timescale concerning probable costs of each upgrade. I understand these will likely be very preliminary in most cases.
- 4) Any plans or interest your Collaboration has in adapting your detector or detector subsystems (or detector R&D) to study electron-nucleon and electron-ion collisions with an eventual eRHIC upgrade. This is relevant only near the end of the decade addressed here, but will be important for planning purposes. (We may well be forced by financial or environmental considerations, even for a first MeRHIC stage, to consider options in which acceleration of the electron beam is carried out around the RHIC tunnel, requiring some scheme for getting an electron beamline through or around PHENIX and STAR. So it's worth considering if there is some way you could make use of the e-p and e-A collisions if we provided them.)

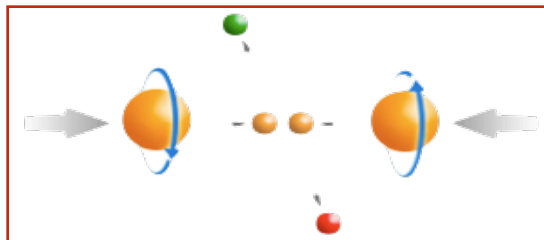


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Part-III: Evolution of the collaboration

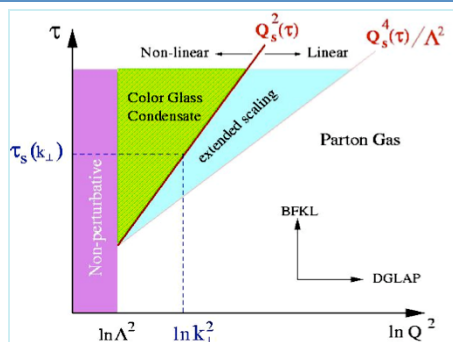
- 5) The envisioned evolution of your Collaboration through the decade: institutions that may leave, others that might join, any plans to keep your Collaboration healthy and vibrant as RHIC becomes a “mature” facility.

STAR Physics Focus



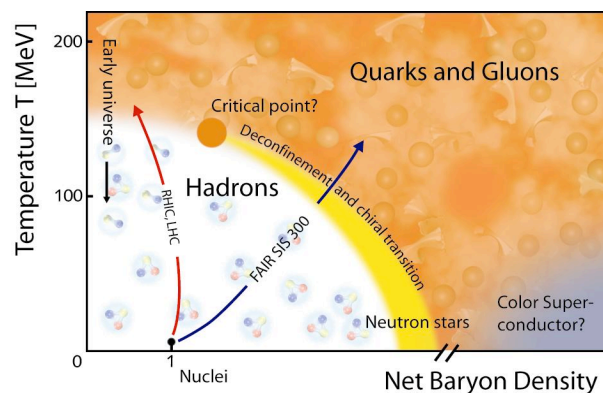
Polarized $p+p$ program

- Study *proton intrinsic properties*



Forward program

- Study low-x properties, search for **CGC**
- Study elastic (inelastic) processes (pp2pp)
- Investigate *gluonic exchanges*



1) At 200 GeV top energy

- Study *medium properties, EoS*
- pQCD in hot and dense medium

2) RHIC beam energy scan

- Search for the **QCD critical point**
- Chiral symmetry restoration